Hyperprolactinemia in a Student Naval Aviator

Alfred F. Shwayhat, DO MPH MHA FACP FACE
Commander (FS), Medical Corps, US Navy
Resident, Aerospace Medicine PGY3
Naval Aerospace Medicine Institute
Pensacola, Florida

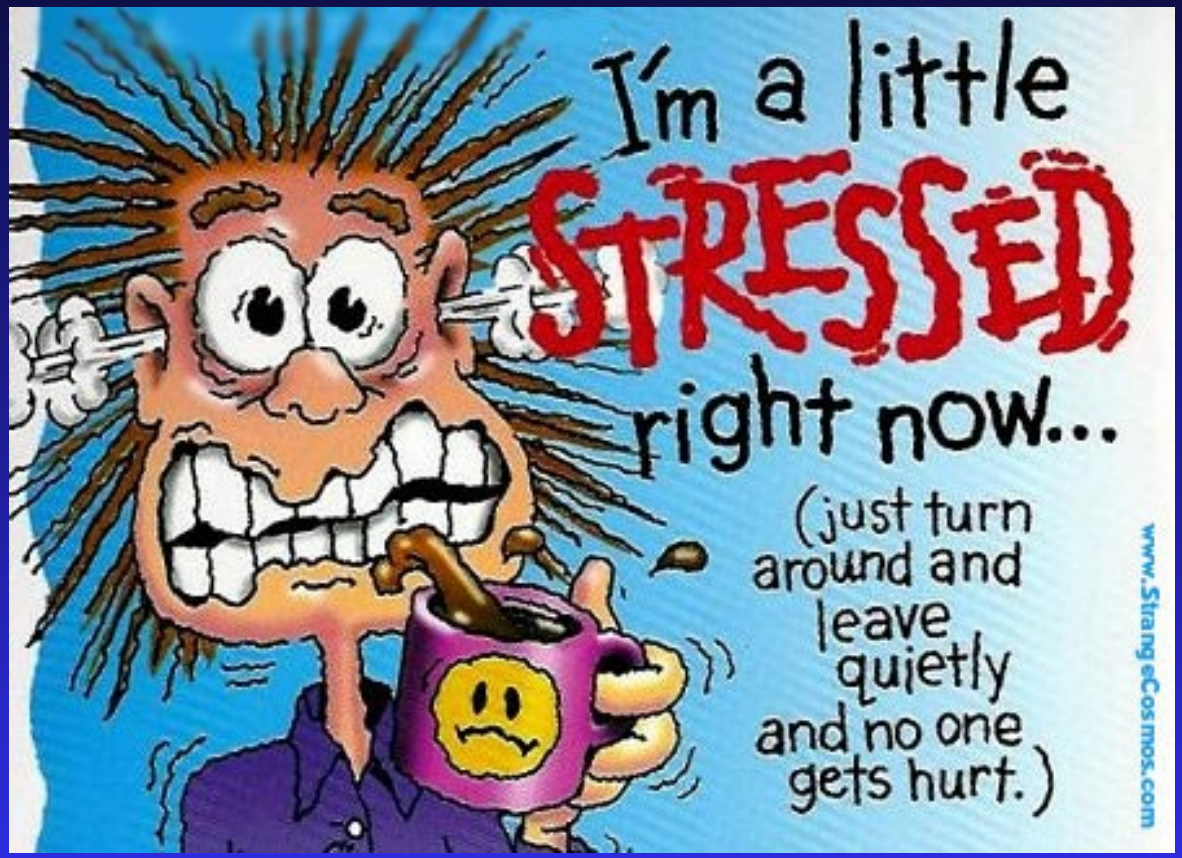
Case Presentation

- 24 year old male 2nd Lieutenant SNA.
- Chief complaint: “I cannot sustain erection > 15 minutes. “Able to achieve erection and ejaculate.
- PMHX, PSHX, FAMHX noncontributory.
- Social history: single, sexually active, no children.
- Physical examination (documented as) normal.
- Labs drawn by unit flight surgeon:
  - Serum prolactin 25.42 (2.6-13.3) ng/mL
  - Serum testosterone 7.83 (1.75-7.81) ng/mL
- Rx given for vardenafil (Levitra).
- Referred to NAMI IM: “consider prolactinoma”.

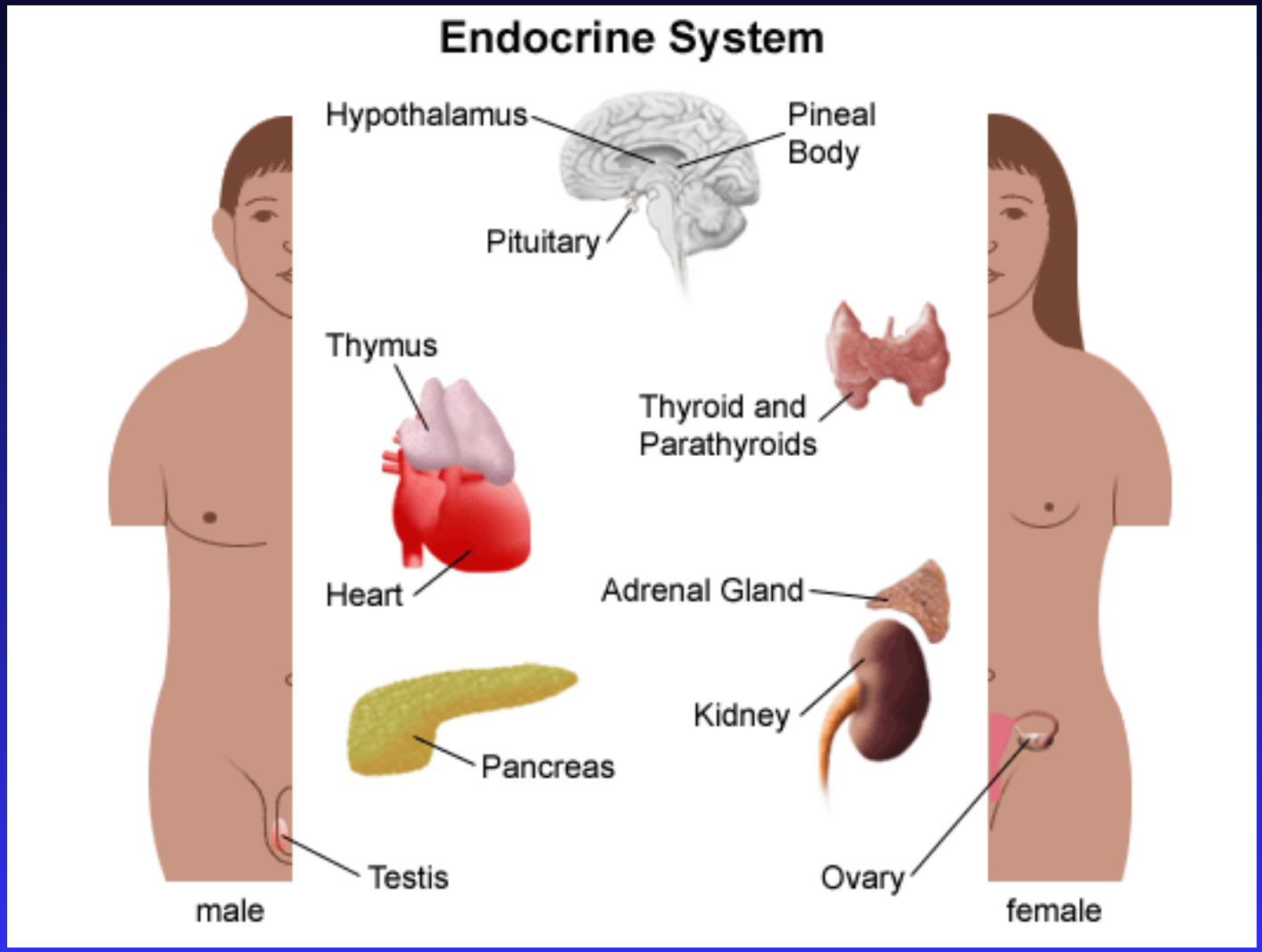
Case Presentation

- NAMI Internal Medicine:
  - Detailed H/P performed.
  - Patient admits to use of performance enhancing supplements.
  - Physical examination: benign. Gross visual fields normal.
  - ROS: normal.
  - Repeat prolactin at optimal conditions 29.99 ng/mL.
    - MRI sella obtained reveals hypodense area in *posterior* pituitary dimensions 1.1 x 0.3 x 0.3 cm. No deviation of stalk.
      - Report: “probable microadenoma; consider prominent vessel”
  - Patient advised to stop all supplements prior to repeat testing.
  - Referred to civilian endocrinologist for opinion.
    - Consultation report: “pituitary microprolactinoma; recommend treatment with cabergoline and f/u imaging in 6-12 months”.
  - Patient returns to NAMI IM for f/u and aeromedical consideration of diagnosis and drug treatment.

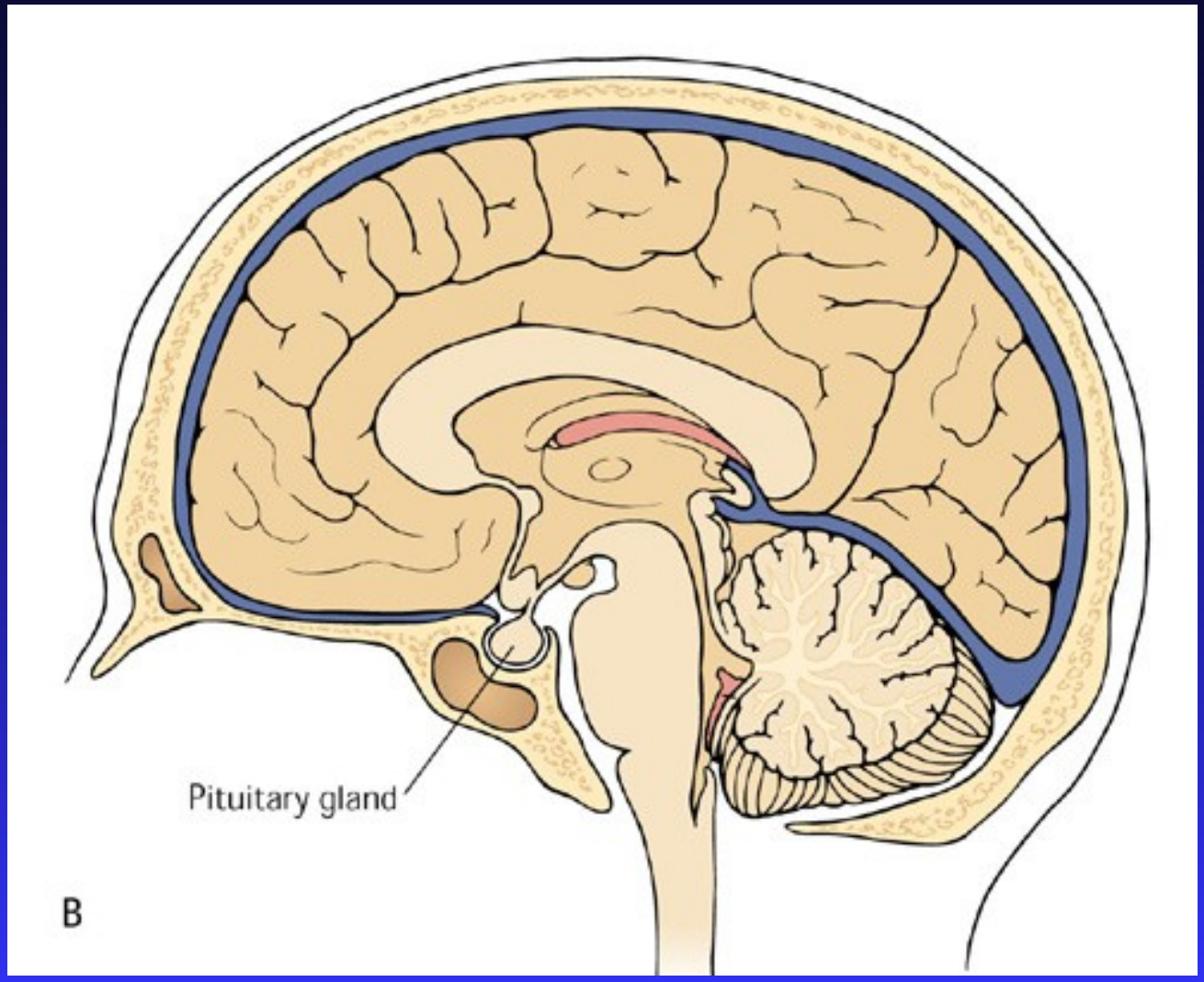
Overview of Pituitary Anatomy and Function



The Glandocracy



The Pituitary Gland



Basic Pituitary Hormone Secretion

- Anterior pituitary:
  - Growth hormone (GH)
  - **Prolactin (PRL)**
  - Follicle Stimulating Hormone (FSH)
  - Luteinizing Hormone (LH)
  - Propiomelanocortin → Adrenocorticotropin (ACTH)
  - Thyroid Stimulating Hormone (TSH)
  - Other peptides

- Posterior Pituitary
  - Oxytocin
  - Antidiuretic Hormone (vasopressin)

Hyperprolactinemia and Pituitary Tumors; Pearls to Know!

- Serum prolactin > 200 mcg/L is virtually diagnostic for true prolactinoma. Levels <200 mcg/L are not specific (1).

- Rate of pituitary incidentalomas <1cm in maximum dimension in general population approximates 10% (2, 3).

- **Tenet of pituitary endocrinology**: ***coexistence of a pituitary mass and an elevation of serum prolactin <200 mcg/L warrants a search for secondary causes other than the pituitary mass***.

1. Pituitary Incidentalomas; End Metab Clin of N America; Vol. 29, No. 1.
2. Pituitary Disorders; End Metab Clin N Amer, Vol. 37, No 1.
3. Pituitary magnetic resonance imaging in normal human volunteers. Ann of IM; 1994; 120(10):817-20.

Some Causes of Hyperprolactinemia (1)

- Physiologic
  - Pregnancy and Post partum
  - Stress and Exercise
  - Sleep
  - Nipple stimulation (chest wall tumors).
- Drugs:
  - Phenothiazines
  - All classes of antidepressants
  - Metoclopramide
  - H_2-antagonists
  - Serotonin reuptake inhibitors
  - CCB, methyldopa, reserpine
  - Estrogens
  - Opiates
- Heavy Metals
  - Lead
  - Arsenic
  - Cadmium
  - Others
- Medicinal Herbs
  - Echinacea purpurea
  - Hyericum perforatum
  - Purariae isoflavone
  - Cimicifuga racemosa
  - Acacia nilotica adansonii
- Pathologic
  - Functioning adenomas
  - Non-functional pituitary adenoma
  - Primary hypothyroidism
  - Chronic Renal failure
  - Idiopathic
  - Acromegaly

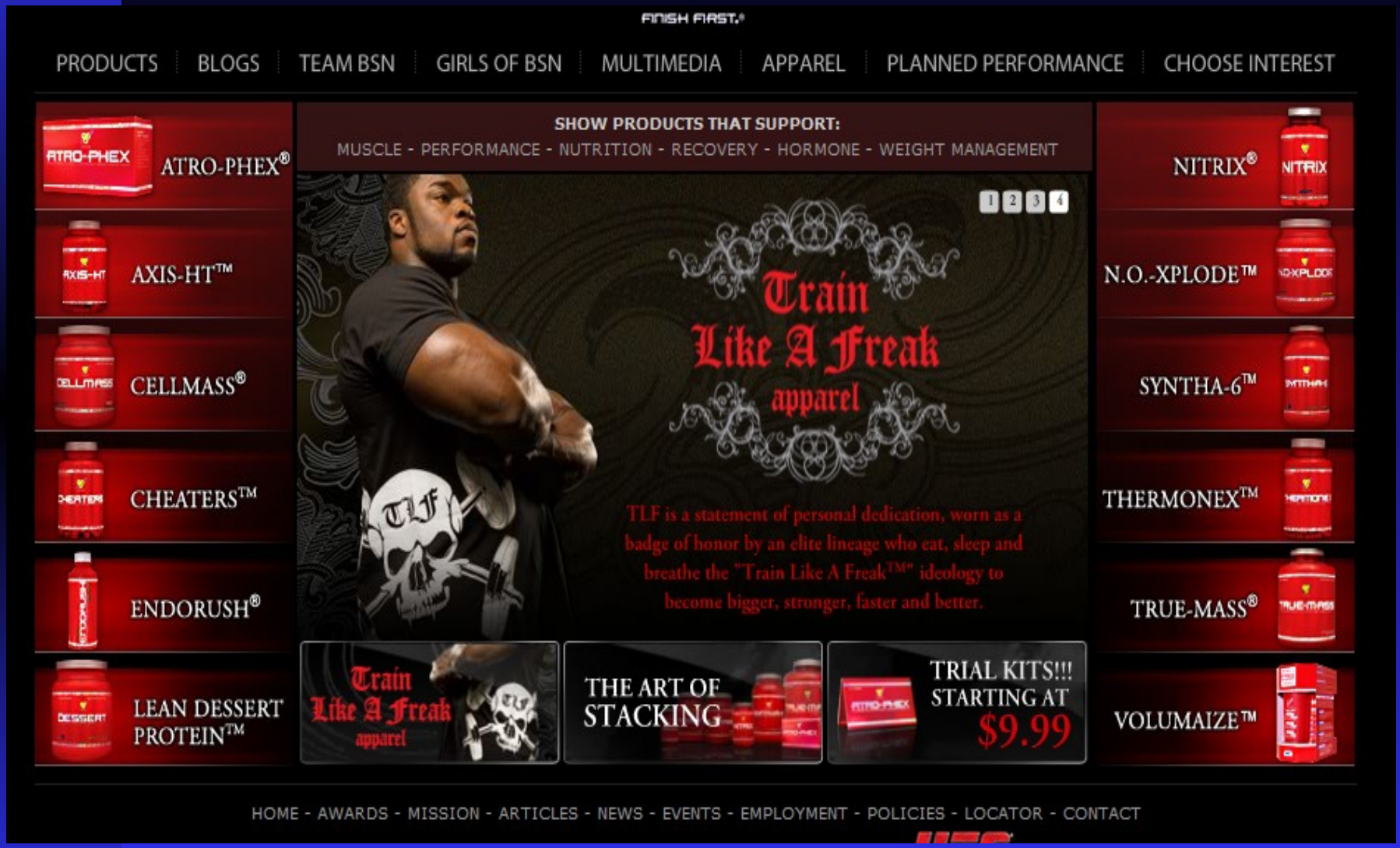
1. Pituitary Disorders; End Metab Clin N Amer, Vol. 37, No 1.

Back to the Patient

- SNA asked by NAMI Internal Medicine to bring in his supplements:
  - BSN Cellmass: “Creatine”.
  - BSN Axis HT: “Testosterone”
  - BSN Syntha 6: “Complex protein”
  - Hydroxycut Hardcore
  - Classic Whey Protein

Question: What’s in this stuff?

The BSN Website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SUPPLEMENT FACTS

Serving Size: 2 Tablets
Servings Per Container: 60

	Amount Per Serving	%DV†
Magnesium (magnesium aspartate)	150mg	38%
Zinc (monomethionine and aspartate)	10mg	67%
StAR-P2™ (PATENT PENDING) ANDROGENIC-ANABOLIC TESTOSTERONE MATRIX	2238mg	**
Inositol Hexaphosphate		**
TPS3™ (3 Fraction Tribulus Terrestris composite yielding a precision ratio of Protodioscin and Saponin concentrations)		**
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night with your last meal. AXIS-HT™ works synergistically with protein and carbohydrates to help promote muscle anabolism. It is therefore highly recommended that you take AXIS-HT™ with a protein and carbohydrate-rich meal or shake.

IMPORTANT: Use AXIS-HT™ for at least 6 weeks in order to fully maximize its anabolic-androgenic potential. Do not exceed 12 weeks of continuous use. NOTE: If a reduction in androgenic effects is desired, cut dosage in half.

WARNING: Before consuming AXIS-HT™ seek advice from a health care practitioner if you are unaware of your current health condition or have any pre-existing medical condition including but not limited to: high or low blood pressure, cardiac arrhythmia, stroke; heart, liver, or thyroid disease; anxiety, depression, seizure disorder, psychiatric disease, diabetes, pernicious anemia, difficulty urinating due to prostate enlargement, or if you are taking an MAO inhibitor or any other medication. Do not use if you are pregnant, nursing, prone to dehydration, or exposed to excessive heat. Reduce or discontinue use if sleeplessness, tremors, dizziness, nervousness, headaches, or heart palpitations occur. AXIS-HT™ is only intended to be consumed by healthy male adults 18 years of age and older. After 12 weeks of use, discontinue for at least 4 weeks. Keep out of reach of children and pets.

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Supplement Constituents and Waiver Guide Class

1. BSN Axis HT (Class C; *banned*):
   - Androgens, growth hormone derivatives, medicinal herbs (19 total ingredients).
2. Hydroxycut Hardcore (Class C; *banned*):
   - Caffeine (300mg), caffeine derivatives, other stimulants, yohimbine (16 total ingredients).
3. BSN Syntha 6 (Class A; *allowed w/FS oversight*):
   - Protein matrix from 3 different sources, TG (8 total)
4. BSN Cellmass (Class C; *banned*):
   - Creatine and creatine derivatives (6 total ingredients)
5. Classic Whey Protein (Class A; allowed *w/FS oversight*):
   - Max allowed in aviators: 2 X RDA value (1.58g/kg).
   - SNA ingesting > 3.84 gms/kg *not* counting dietary sources.

1994 Dietary Supplement Act does not require that dietary supplements be shown to be safe and effective before they are marketed!

Patient Assessment and Plan

- Hyperprolactinemia
  - Repeat prolactin x 2 in optimal conditions: *normal.*
- Hyperandrogenemia
  - Repeat testosterone x 2: *normal.*
- Posterior pituitary mass
    - No deviation of stalk
    - Involvement of posterior and not anterior pituitary
    - Extremely unusual shape for an adenoma
    - Mass unrelated to hyperprolactinemia
    - repeat evaluation with imaging in 6-12 months.
- NPQ/AA; waiver being considered for pituitary mass.

Take Home Points

1. 1994 Dietary Supplement Act allows unsafe products to be marketed to our patients.
2. Our patients are using these supplements.
3. It is impractical for practicing physicians to assess the true content or safety of each supplement.
4. If you don't ask……they won't tell.
5. Erroneous diagnoses can impact health……and career.
6. The glandocracy……know it!

QUESTIONS ?

CASE REPORT

Amphetamine Lacing of an Internet-Marketed Neutraceutical

Minh H. Nguyen, MD; Tom Ormiston, MD; Sanjay Kurani, MD; and Denise K. Woo, MD

A 25-year-old woman presented with abdominal pain after taking an imported herbal weight-loss product. A urinary toxicology screen was positive for amphetamine, which the patient denied taking. On further investigation, the neutraceutical was found to contain an amphetamine derivative banned by the US Food and Drug Administration (FDA). Although the patient had discontinued use of the supplement before hospitalization and her symptoms steadily improved with appropriate treatment, a report was made to the FDA. Similar reports from cities across the United States prompted the FDA to confiscate shipments of the product before it could be distributed further nationally while they investigate claims against the product.

Mayo Clin Proc. 2006;81(12):1627-1629

Brazilian weight-loss supplement, Emagrece Sim (purchased on the Internet from www.emagrece-sim.com), which she had discontinued 2 weeks previously. The patient reported that she had had palpitations and felt mildly tremulous after taking the supplement. Friends who were also taking the supplement had experienced similar uncomfortable excitability. She denied having chest pain or shortness of breath. The abdominal pain was described as dull and midepigastric with a sharper quality at various times. The patient had been evaluated twice by physicians as an outpatient during the previous 2 weeks, and gastroesoph-

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